

HOMEOWNERS PLUMBING HANDBOOK



MARC STEWART

Homeowners Plumbing Handbook

Marc Stewart

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This book is normally only available for sale on Amazon as a paperback.

Today it is free to you in the hope that if you appreciate this book being free in any way. In return you would consider taking time out to visit by way of Google search for Sangreal on Indiegogo, my crowd-funding project.

And help in any way you can by way of your kind contribution in exchange for one of the many great perks you will find there.

Or if not able to contribute with money doing something just as valuable for us by spreading the word about Sangreal the family dice board game.

Sangreal . . . some do . . . some don't have a beautiful mind!

The following are three testimonials from players recently after filming for the Indiegogo pitch video you can watch to see why Sangreal's time has come with your help!

Three Testimonials:

Sue said, “Well I’m really surprised by how much I’ve learned about you two today, and I think Sangreal’s the kind of game that gets you talking to each other”.

Bonne said, “Yeah”.

Sue said, “And not so much about yourself, although of course Sangreal’s about you, Sangreal is about what you share, but things a little more than ourselves”.

Jenah said, “I learned something about you too”.

Sue said, “Ah cool, yeah I love that about Sangreal, it’s amazing”.

Bonne said, "Sangreal's a game that you can learn from, Sangreal sort of opens up conversations on topics about people that you may know but also things like Sangreal sort of brings in topics that are not that usually spoken about or wouldn't usually or come up in a conversation".

Sue said, "Yeah".

Bonne said, "Sangreal kind of opens up your world, and Sangreal's kind of good though because you get to exercise different thought processes".

Sue said, "Yeah that you wouldn't normally".

Bonne said, "Like the cards you bring out, like you really have to think sometimes".

Jenah said, "Sangreal gives people a chance to say something without prejudice and they can say something honestly they think without people having to go on a huge debate against them or Sangreal's just hearing peoples ideas which is nice"!

Sue said, “Yeah, perspective”. Bonne said, “I quite like the fact that Sangreal is not competitive, because most games out there are and these games depends on who you play with, it can ruin the game if your playing with someone who is really competitive or is a really bad, you know a poor loser, but because Sangreal’s a game where everyone is equal at the same time and that includes everyone when it is your turn as well, Sangreal’s quite enjoyable”.

Sue said, “Yeah, Sangreal’s more ethical, it’s the level of co-operation, Sangreal’s cool”!

Sangreal board game . . . some do . . . some

don’t have a beautiful mind!

For more information about the true depth of the Sangreal project on Indiegogo visit the homepage of my qofs.org website and bookmark it today and tell your friends about it.

And I hope you enjoy your free gift from me to you of this book.

Yours genuinely Marc A Stewart

<http://igg.me/at/sangreal>

Gaining access to hot and cold water lines:

Whether for your renovation or for a new addition the procedure for tapping into or extending off existing hot and cold water lines is the same. Choose the type of water line pipe system available at your local plumbers' merchant store. In Australia and New Zealand Secura by Dux industries is preferred. Since the late 1970's early eighties. These poly plastic hot and cold water piping systems have come a long way. And now generally carry a 50-year warranty. You will find either an old poly system or copper or galvanized water pipes in your walls behind existing plumbing fixtures such as your shower, bath, basin, laundry and kitchen. And also under the floor if wooden or overhead in the roof cavity above the ceiling.

Whatever piping material you find we will be redirecting the old lines into new poly crimped brass and copper elbows and tees and adaptor fittings. The first task is to turn off the hot and cold water supply.

Turning off the water supply:

The cold water supply is usually found out the front on the street or behind each flat or unit, or sometimes inside the basement or garage. If possible test an outside hose tap to ensure isolation valve from street pressure has indeed closed off the flow. In cases where this flow is reduced but not stopped call your local council as these street stop valves are generally still the property of the city you live in and therefore they will attend to any repair needed to bring flow to zero.

Check cold water taps inside the home to find out if indeed turned off. If off. Now run a hot water tap and see if this hot flow has also stopped at the same time. If the hot water taps are still running it means your hot water system is supplied by a low-pressure header tank. And you have a low-pressure hot water cylinder in a cupboard or the basement or up in the attic below the header tank. Or the cylinder may be an older type with the header tank directly attached to the top of the hot water cylinder. After locating the hot water cylinder check to locate gate valve on the low-pressure cold supply line from the header tank into the bottom of the hot water cylinder. If you find

such a valve turn it off anti-clockwise and recheck to ensure hot flow has stopped coming out of hot water taps. If you cannot find such a valve near the hot water cylinder or up beside the header tank just keep the hot water taps running until the header tank either in the roof space or on the roof has drained down through the hot water cylinder. This draining down may take about ten minutes.

However if you discovered that the hot water taps stopped running when the cold water from the street stopped running. Then you either have a mains pressure hot water cylinder operating off street cold pressure. Or you have a cold pressure reducing valve low pressure hot water system installed under the hot water cylinder or up in the attic or on the roof since replacing an older header tank, or fitted as new.

Please Note:

There is sometimes a low-pressure header tank providing the flow of the cold as well as the hot low pressure to all tap ware and shower valves in the house. If you find you have an equal low-pressure hot and cold water supply system. Either locate the tank above you and turn off its out flowing valves to all pipes or simply test cold water supply to this header tank is off from the street pressure or pump if in a rural area. And drain down through the cold taps.

Whatever you will find will fit into one of these events unless you are on bore water brought up by a pump out of the ground or out of a low supply storage tank by way of a cold water pressure pump. In these cases shut off the pump power supply and close off the isolating valve on the inlet or outlet side of the pump. There are also times when a pump is used to build the pressure up to mains pressure in the home or times or when it is used to provide a fast flow into a higher still equal low-pressure header tank or through a pressure-reducing valve under the low pressure cylinder for the hot water system. Sometimes by way of a header tank on a tank stand, or in the attic or on the roof.

Once the water hot and cold has been placed under control to off position it is time to remove the old plumbing fixture.

Removing an old bath, taps and waste trap:

Place a screwdriver end inside the opening of the bath tap and using this leverage with another hand on the top of the tap turn anti-clockwise to wind it off and out of the inside the wall wingback elbow. Then repeat for second tap. If there is not enough room to

swing the tap around undo the head works of the tap by removing the top indicator dial and unscrewing the tap body etc. Next go underneath the bath and remove the trap from the end of the waste pipe. If the trap is made of copper or lead and there is no visible thread on the outlet side of the trap just cut this waste pipe some ways back towards its outflow into the main drain. If you cannot physically get under the floor below the bath remove the paneling skirt around the bath and run the top of the trap through with a hacksaw with a 32 teeth to the inch blade. Or if you can undo the top trap nut where it meets the bottom of the plug and washer on the bath than do this.

Now break the entire baths frame accessible and remove bath by first removing wall board above bath as necessary. Now with the bath removed you will be able to get your first good look at what the existing hot and cold water pipes are made of and their respective sizing. If you find galvanized steel piping and you have a concrete floor do not worry. You will be able to purchase a coupling with a rubber seal that can go over the galv pipe down low about 4-inches (100 millimeters) above the floor where you are about to cut them with either a hacksaw with a 24-teeth to the inch blade or the use of a battery or electric sabre saw to ease the workload. However if your new plans allow you another position of your water pipes to begin the running of your new poly pipe work. Then

work out how far back into the wall these galv wingback tap outlet elbows are as you may be in a position to block these pipes off at the elbows for good.

If you find your pipe work is in copper. Also cut them both about 4 inches (100 millimeters) above the floor level. And remove the screws and the remaining brass wingbacks that the taps were screwed into.

Please note: If the copper pipe is bent or out of perfect roundness anywhere near the cut off point then relocate your cut to further up the pipe then 4 inches above the floor.

Generally you will find two different sized pipes used a $\frac{3}{4}$ -inch (20 mm) for the hot and a $\frac{1}{2}$ -inch (15 mm) for the cold line. Whatever you find is ok. There is also the chance of uncovering and striking an unknown pipe type made out of either black or grey plastic. In these cases do not cut the piping until you can establish at your plumbers merchant if they have a comparable match for it to allow an adaptor-fitting set-up for this older piping. If worst comes to worst. You will simply have to use the standard industry threads inside where you removed the old tap ware. Still being either $\frac{1}{2}$ -inch or $\frac{3}{4}$ -inch threading. And if coming off this older piping to either place wingbacks for a new bath position or you are upgrading to a stand up shower or relocating or placing a toilet

or vanity or pedestal basin. Either way there is an adaptor set up you can use. It just pays to seek out the options each existing water piping material gives you before rushing in at it.

Removing an older vanity basin:

Now if you have removed the bath and you are also removing an older basin then now is the time to do so. Simply remove the basin vanity trap same as you did the bath. Either unscrewing all of it or unscrewing and cutting off the waste pipe or removing the waste pipe altogether if you will not be reusing it.

Next go under the basin and undo the nuts where the tap ware pipes come out of the wall. Or if there are no nuts use a hacksaw.

Changing the toilet pan and cistern:

Now if you want to change your toilet over to a more modern style or are wanting to move it to another position in the same room or nearby.

Can you get under the floor to access the main trunk line serving this existing toilet?

As if you have a concrete floor then look to see if the toilet pan itself is a P-trap going outward's by flowing through the wall. Or is it an S-trap pan flowing outward's through the floor? And sometimes you can strike a turn to the left or to the right P-trap pan called a turn-trunk pan. These all go through the wall or may as an afterthought discharge through a bend through the floor also.

Either way if you have a concrete floor and you wish to change the position of your toilet by an amount left or right see if you can plan it so your new position is still on the outside wall near the drains, and wall pipe work beyond this wall.

If you do wish to relocate this new toilet to a position in towards the middle of the room off the outside wall then know that you will have to cut up the concrete floor and place a new section of 4-inch (100 mm) PVC drain underneath this slab going out and joining into the main sewer drain outside this room under the path or ground thereof with a Y-junction.

Water piping revisited:

Regardless of the material your existing water piping is made of simply ask at your local plumbers merchant shop the best way to connect their crimped poly pipe water system to the material you have but more on different applications shortly.

You will also need to buy test plugs to cap off all of the new wingbacks you are about to install. And make a written note of how many yards or meters of water piping you will need. It comes in straight lengths or a coil.

Also make a mental note of which pipes are your hot pipes and which are your cold. Usually all are in equal pairs hot on the left or on the right side as you look at the wingbacks. Also you are going to need some 4-inch X 2-inch (100 mm X 50 mm) timber and 3 inch (75 mm) nails to place behind the new positions of your wingbacks.

And you will need at least one sharp 1-inch (25 mm) wood drill bit. For all the holes to place water pipe inside wall timbers.

Now that your old plumbing fixtures have been removed. Open up the wall between the two

timber uprights (studs) directly behind where the new plumbing fixtures will be such as the tap end of the new bath, or the new shower mixer, vanity basin or toilet position.

Shower mixer:

If installing a shower mixer choose a mixer suitable for high pressure cold and a low-pressure hot feed valve.

Or if on full street hot mains pressure an equal mains pressure shower valve. Position the timber for the screwing off of this mixer about 3 foot 3 inches (1 meter) off the floor to the left or the right of center of the shower tray nearest to the opening of the shower door.

The instructions for the shower mixer will give the measurement from the finished wall back to the face of its fixing timber.

Now place another noggin center of the wall measurement of the bath end or of the shower tray wall at 6-foot (1.8 M) above the bottom of the shower tray.

With the face of this noggin back the depth of the wingback from the finished wall surface.

New bath:

If installing new bath taps out of the wall into the new bath position place this noggin timber about 4-inches (100 mm) to the center of the wingbacks above the finished lip of the baths top outer edge. The face of this noggin may be about 1-inch (25 mm) deeper than your wingbacks back inside the wall. Use $\frac{3}{4}$ -inch (20 mm) diameter wingbacks for the bath taps for greater flow into the bath.

New toilet cistern cold feed:

For the wingback for the cold water feed inlet to your new or existing toilet cistern check where the cold inlet feed valve male thread is located. In most modern cisterns if a bottom entry valve you can swop the side the valve comes into the tank by undoing the bottom-backing nut repositioning and retightening.

Some toilet cisterns demand entry of the cold water feed into the top just under the lid coming in from the wall cavity behind a cut-out section of the cistern tank and for this type position the pan on a flat floor and place the cistern accordingly. Measure the new wingback

center to be placed ½-inch (15 mm) above the cutout in the cistern. Take this measurement off the floor and place your timber noggin in the wall using the measurement you just took to give accurate placement of the ½-inch (15 mm) male wingback. You will also need a small inline ball fix valve to come off the wingback and bridge between the cold-water inlet valve by way of a flexible hose provided.

If a bottom entry cistern is to be installed place your noggin (noggin) timber about 4 inches (100 mm) above the finished height of the floor skirting board around the wall. Again using a ½-inch (15 mm) female wingback. This bottom entry cistern valve will be reached by way of a straight stainless steel flexi hose longer than the measurement between the cistern wall tap and the bottom of the male thread of the cold valve inlet.

Please note: For the bottom entry and side entry cisterns you will need a small compact right angle cistern tap.

Hidden pan connector concrete floor:

When placing a close-coupled toilet pan and cistern with hidden connections underneath onto an existing concrete floor drain position. If the old collar rising up through the floor is PVC then use a carpenters' wood saw and cut it off flush with the concrete. If the collar rising up through the floor is clay place a tight rag down inside the pipe up stand and working with inside to outside tapping with a hammer break this collar off even with the concrete floor. If the collar is cast steel you will have to grind it out of the way. Then go to your plumbers' merchant store and buy a rubber ribbed at the bottom plastic pan connector that has a drop over into it rubber seal on the top. Take home any other type of pan connector you can get to also try out (do not try and use a full rubber connector). At the end of the exercise you must clean off the concrete surface and run a masonry grade silicone around the new connection onto the concrete to make sure it is an airtight—watertight seal.

Note: There are also offset pan connectors that you may have to use if the new pans center of its outlet is different to the existing drain collar center from the wall to the center.

Best practice is to buy the best fitting pan and cistern you can get that closely matches your existing wall to center of spigot measurement.

Likewise if the existing collar is coming out of the wall. Your new P-trap pan spigot center-to-center measurement cannot be lower than the existing pipe center allowing for the change in slope change in measurement off the floor.

New toilet—wooden floor:

If you have a wooden floor underneath your toilet you can either get under the floor directly or cut a hole in the floorboards and gain access that way. Either way you are in a position to easier adapt the pipe to bring the new PVC pan connector up through the floor center of the new pan spigot. If the existing drain is clay grab a felt tip pen and mark a line around the barrel of the pipe below the bottom point of any offset made by bends you may need to use to give yourself the correct center for your new pan. Then take a cold chisel and with a hammer strike the chisel against the clay pipe. Then simply do so 1/4 of the way around the barrel and then 1/2 way round and 3/4 the way round and then in-between these blows. Going around and around until the pipe cracks

completely all the way through. If it breaks unevenly you can tidy it up by nibbling away with a large shifting spanners jaws. A rubber earthenware to PVC coupler will complete this joint being done up with large stainless steel clips with a screwdriver to seal after you have made up your offset of bends as required. To finish off the top end through the floor. Just let the new PVC 4-inch (100 mm) pipe rise up past the floor level and cut it off later flush with a carpenters wood saw and glue up the finishing pan connector collar which will fit inside this pipes interior bore.

In cases where this riser is fairly short and hunched in concrete below the floor above the dirt of the ground. Snap off the pipe at the point where it touches the concrete and use a PVC fitting designed to fit inside the clay pipes internal diameter. And either use a masonry silicone to make it airtight or use a mix of 6 to 1 sharp sand and cement mortar to create a seal around this slip socket and the existing concrete.

If relocating a toilet to a position to the left or right:

Do the same as above to gain your bottom most connection then come off this connection with a 90 degree bend and come across using hanger clips off the wooden floor joists. Then turn and go up to the new position with your second 90-degree bend. And rise up through to place your pan connector. The gradient is formed naturally by the over 95-degree angle of the bends you are using.

Temporary toilet flush:

During a new bathroom build it is always possible to temporarily flush the toilet pan so placed by using a full bucket of cold water.

Relocating a through the wall P-trap pan:

Stand the new pan on a solid floor and measure from the floor to the center of the outflow spigot. Write this measurement down and then measure from this spigot to the finished wall. Place your floor to spigot center measurement onto the wall and drop down about 3/4-inch (20 mm) below this for the true center of your 4-inch (100 mm) hole in the internal wall. Use an off cut of 4-inch (100 mm) PVC pipe and mark around it to mark off this hole. Cut out this hole and using either a wood or a masonry drill gain a hole through the outside just big enough to sight on the other side outside. Then measure down from this at center hole and remark it 1-inch (25 mm) lower to give this outside hole gradient. Note: This outside hole must be made big enough for the size of the collar on the PVC bend.

Next you must work out the gradient slope from the bottom of this hole to the bottom of another 90-degree bend or tee junction if a stack or vent coming down from above. Wherever this slope strikes will decide what you are to do to complete this new pan project sewer wise.

If on the ground floor and the size of the existing soil pipe is less than 4-inch (100 mm) follow it into the ground and below until you can reach and join in where the drain is 4-inch (100 mm).

If coming out of the wall on the first floor or higher up. If not 4-inch (100 mm) diameter to begin with. Lower the bend or the tee in this 3-inch (80 mm) PVC line and then run this section of piping in 3-inch (80mm) all the way to the pan using an 80 mm pan connector at the end.

Note: If possible always go to 4-inch (100 mm) size pipe for this run from the new pan. **Note:** To either connect into a copper or lead soil pipe or cast as the case may be use rubber couplings. If having to work in a tee junction you will have to use a rubber coupling for this top most joint anyhow. Simply slide the rubber coupling up over the top most vent or top stack pipe fit the tee and then slide it back down. Sometimes it may be necessary to use a second rubber coupling below the tee to ease the union of these rigid PVC fittings into place.

Fitting off a close coupled toilet:

Place pan on floor over the top of and inside the pan connector.

Take rubber cistern to pan connector and place silicone on both its top and bottom. Carefully place it. Then carefully lower cistern down onto top of this rubber keeping an eye on the line up of the cistern to pan bolt-holes, as this is paramount. Then resting the cistern place the bolts and do them up keeping an eye on the gap closing down between the cistern bottom front edge and the pan. You may find you will need a screwdriver to tighten these nuts up properly.

Now with the water shut off to the cold wingback remove the barrel nipple and place the new cistern tap following instructions for the use of nipping brass or brass threaded tubing given under the heading Replacing or placing a tap into a wingback in the wall:

You will need ½-inch (15 mm) threaded brass nipple tube.

Now that you have your new cistern tap pointing upwards measure the distance between the male connections and add 4-inches

(100 mm) and buy a flexi hose that is straight and this rough length and install it by first tightening it onto the bottom of the male thread on the inlet feed valve. And then holding against yourself on the flexi hose tighten the other end onto the cistern tap. Fill cistern with water through the tap and flush to test for leaks. Once you are happy with this installation take a white adhesive silicone and with a nozzle cut to a 45-degree angle by about ¼-inch (10 mm) gap in the tip. Work from the very back of the pan where it touches the floor and seal it off from any moisture. Also fill the screw holes, as you will not be using them the silicone will do all the work. Using damp wipes clean off the excess silicone around the pan and off the floor finish.

Shower tray waste line:

Take the tray and position it up against the bare timber of the studs of the internal wall where it is to be fitted. Mark the full circle of the waste hole onto the existing floor. Take away the tray and mark outward a further 1 and a ½-inches (40 mm) in a square shape hole to be cut out. Using a circular saw or a jigsaw cut out this square hole.

This hole once cut will let you know straight away if you have any floor joist timber to move out of your way or whether it is good and clear. At this point if you are rejoining into an existing old shower or bath waste. See if there is movement of this waste pipe back towards the drain. If there is flex in it enough go ahead and assemble the shower waste trap into the tray. And then working back from the tray and the trap use suitable bends to bridge the gap onto the existing waste pipe.

However if you cannot easily get under the floor. Measure the exact centers off the tray to the traps position in the middle of the hole and transfer these measurements onto the floor by the hole. Place a PVC straight coupling or PVC to copper or to lead adaptor onto the waste pipe and using a rule inside this coupling socket measure to the inside of the coupling socket when you are holding the trap waste in exact position between your floor marks. Then take this measurement and cut the straight section of joining pipe you need or if you need to place a bend or bends for an offset place them now and take another straight pipe measurement into the trap. Then make a dry run and sight the trap to make sure it is exactly positioned in the center of the tray hole. Also you will need to make allowance for this trap to protrude upwards through the floor as required to neatly come in under the tray hole lip.

When you are happy with the dry run refit the tray and check the starting of the trap inner male thread insert section into its threaded female half. Remove the tray for the last time and mark the point where the PVC tube passes into the trap socket and the other socket at the waste pipe end. Also mark across down the length to give an indicator to work to when gluing to achieve the same angles.

Note: With a shower tray there must be fall in all directions the waste pipe takes all the way to its outfall at the drain or it will not drain properly.

Please note: Before final fitting of the easy clean waste trap for the shower you will have to make sure the tray is packed up to level all around and glue placed under the tray to hold it firmly as per the manufacturers recommendation.

A four-way riser or a saddle:

If you cannot get the fall required go outside and take a look at the gully dish where the shower waste is discharging at the moment but is just too high. If it is clay you will have to dig

it up and pull out the up stand out of its P-trap. Having done this you will be able to fit clay to 4-inch (100 mm) PVC adaptor and rising up out of this place a four-way riser after drilling out the entry point you wish for the shower waste. Then continue on upwards to the new PVC gully dish to take the drain to its completion point and transfer any remaining other waste pipes into it.

New vanity position:

If installing a new or relocating an existing vanity basin grab 2 one foot long (300 mm) elbow stainless steel flexi hoses from the plumbers merchant shop and place them on the end of the tread hanging down from the basin taps underneath inside the cupboard or so on as the case maybe below if a pedestal set.

Measure from the floor to where the elbows are hanging and add 4-inches (100 mm) to this measurement. This is the height you will place your new timber noggin at to screw the new wingback elbows to.

Be careful to take note of the best position for these wingbacks in relation to the open cavity provided for this plumbing.

The vanity basin waste:

If the vanity basin is opposite to an outside wall you can use a P-trap and go directly out through the wall and drop down into the gully dish or into the existing waste pipe. Using a cleaning eye bend where it comes out of the wall. Or if the existing waste is still accessible under the floor it can either be transferred into the wall cavity or brought up to a P-trap.

Or an S-trap can be used and taken downwards through the floor. Also if you have a concrete floor and your new vanity cupboard trap position is to the left or the right but still under the cabinet the waste pipe can be cut just above the floor and redirected along the floor on top of the concrete underneath the toe space. Than brought up closer to the trap.

If you are shifting the vanity basin to an internal wall position. You can either go into the wall and around inside the wall until reaching the outside of the bathroom or run the waste pipe under the floor to the gully dish or lower with the use of a four-way riser or if already a PVC riser to a gully dish placing a

single 2-inch (50 mm) boss strap saddle on the outside of the riser below the dish by drilling a 2-inch (50 mm) hole and gluing on the saddle to take the new waste pipe.

Vanity plug and washer waste with overflow:

If the vanity basin has an overflow you either have to use a two-piece plug and washer waste or a plug and waste with overflow holes in it.

If the two-piece waste simply silicone seal the top most section and the bottom section and attach using the long screw provided between the two sections through the basin waste cavity. If using the one-piece version silicone seal the top. Then whilst holding the waste in position turn the basin upside down and place silicone around the long thread where it meets the very bottom of the basin where the washer and the back nut go. Tighten and clean the silicone off the inside of the basin and you are done.

Once this is done place the P-trap onto the plug and waste and after considering fall into the wall place a pencil mark where you need

the center of this 90-degree bend to come out of the wall.

Or if you are going to be bringing the waste pipe up through the floor place an S-trap on the bottom of the plug and waste and mark where it will travel through the shelf and down and out through the toe space shelf and through the floor.

If positioning a waste pipe for a pedestal basin and you want the P-trap to keep it all nice and tidy out of the wall. Run the waste pipe before you run the wingbacks for the hot and cold water. It is much easier to run these around the waste pipe than try and run the rigid waste pipe around the water piping noggin timberwork. Also **Please Note:** Install a timber noggin to take the large coach bolt kit to take the extra weight of a pedestal basin. The hole drill for these is half the diameter of the bolts thread size. And they each have plastic washers that enable the offsetting of the level of the basin to be accurate to level it straight every time.

Fitting a wall hung toilet cistern:

Be careful to place timber in the wall behind where the screws are to go to hold up the weight of the water cistern of the toilet. And place your female wingback some 8-inches (200 mm) away from the water entry point on the cistern. Or if an in behind under the lid model cistern place the male wingback as detailed earlier under New Toilet Cistern Cold Feed.

Bath plug and washer:

If placing a bath above a concrete floor you can use a two-part plug and washer waste fitting. Measure the two centers off the wall to the center of the bath waste hole and transfer these measurements onto the concrete floor. This is the marks where the new bath trap will rise up and out of the concrete. Also you will need to use either an adjustable height extender trap or measure the height from the floor up to the lip of the male bath plug and washer and place the trap accordingly in at this height.

With this trap positioned correctly later on it is just a matter of sliding the bath into place with

the bottom half of the plug and washer waste in position above the trap and then with the top hole of the bath lined up silicone in and screw the long connecting screw into place and tighten.

A note on traps and their waste pipes:

The trap always goes as close to the plug as possible as it is the prevention of drain smells rising up through the system. The exception to this is a washing machine outlet trap that is placed just above the floor with a waste pipe rising up to the very top of the machine to take the flexible drain hose off the washing machine.

Sometimes a tee junction may be placed underneath the trap on the laundry tub and run up to the rear side of the washing machine to take in the drainage hose.

Wingbacks for a laundry tub and washing machine:

Firstly if at all possible position your laundry tub in the corner of the room. This always ensures enough space for any size of washing machine that may come along. Once you have it positioned place your tub wingbacks timber noggin about 4-inches (100 mm) above the height of the laundry tub top most lip itself and center of its width.

Then locate the center of the washing machine and place the timber in at 4-feet (1200 mm) above the floor height wise. These female wingbacks are to be placed flush with the outer finished wall ready to take two tiny washing machine tap valves.

If you prefer you can also place these washing machine wingbacks and taps lower out of sight behind the washing machine itself.

A supertub:

The male wingbacks for a supertub are placed 8-inches (200 mm) below the supertubs cold and hot inlet water feed nipples. Each by way of a foot long (300 mm) elbowed stainless steel flexible hose.

Wingbacks set out for a new kitchen and dishwasher:

Open up the wall behind the new cupboard where the new sink bowl is to be positioned. Place the timber for the female wingbacks for the hot and cold lines to the bench mounted tap at 8-inches (200 mm) down from the top most surface of the new bench top. And place a timber noggin for a cold feed for the dishwasher at about 8-inches (200 mm) above the lowest shelf toe space board inside the cupboard off to the side of the dishwasher well under the sink bowl.

If you are not installing an under bench mounted tap, opting for an out of the wall set. You will have to place your female wingbacks

some 4-inches (100 mm) above the finished bench height. Center of the new bowl position.

Water filter under sink:

If you are going to be installing an under sink water filter and a bench mounted filter tap place another cold female wingback next to the dishwasher wingback. To be a separate feed for the filter unit. The placement of this extra wingback will simplify the fit off later.

If this wingback is not provided you will have to provide a ½-inch (15 mm) brass tee and a small inline ball fix valve to go to the filter after branching it in to the cold line feeding the kitchen sink tap.

Running water pipes:

If you have a concrete floor you are forced to use the existing risers coming up into the wall cavity. You will by now have all of the timber in for your new wingbacks and have these positions marked H and C on their respective centers on this timber ready for each new fixture at the time of fit off.

Begin with the cold feed line you are going to use and if necessary block off other existing risers if they are not going to be used. As it is easier to make new branches with poly tees.

All of the cold lines can be in ½-inch (15 mm) diameter bore size. But if there is an inch (20 mm) line available off the hot already then use this main hot feed to begin the running of your new plumbing water lines in hot. If this is not possible especially if the hot is street pressure running all lines in ½-inch (15 mm) is fine.

If you cannot get under the floor you will either have to cut access holes in the wooden floor and take the new pipes down up and over. Or go around the internal walls to take Dux Secura or any other type of plastic poly water pipes around two internal wall corners of the framing studs timber. Take a 1-inch (25 mm) wood drill bit and drill into the studs both sides of the corner then taking a sharp carpenters wood chisel make a notch of each of your holes to allow the recessing of the new pipes. Go in about an inch (25 mm) or more to give plenty of room for the 90-degree elbows and the pipe. Now is the time to also drill out or check out the holes for the horizontal piping and holes through the noggins for vertical piping. Now simply take the end of your new poly pipe and feed it in from the wingback end just letting the pipe overhang there for the

moment. Or if in a tight corner position or for any other reason begin from the existing riser end instead.

It's just a big 3-D jigsaw puzzle of different bits. The pipe cutter for small bore poly pipe is quite capable of fine-tuning the length of a pipe going into an elbow or a tee in a tight position such as an internal wall corner bend in the line or off an adaptor for galvanized (galv) or copper.

Copper jointing:

You should be able to purchase copper olive O-rings that will slip over the outside of existing copper tube if and when you use a copper tube cutter to make the end smooth of no burrs. This joint requires a ½-inch (15 mm) or a ¾-inch (20 mm) brass male thread to poly adaptor fitting and a copper gland nut (crox nut) that must be placed over the copper pipe before the copper olive O-ring is placed on the end. Then sit the brass male thread over the copper end and pulling it back a bit from bottoming out bring the olive up against the thread and do the nut up tightly with two spanners one holding against the leverage of the other. Do not be afraid to over tighten this joint. It can handle it being a metal-to-metal joint.

You do not need to use tape or hemp with this kind of joint. However if it leaks tease out a small thread of hemp and roll it up on top of your trouser leg under your palm with a bit of spit. Then place between the end of the leaking olive and the male thread of the brass adaptor fitting winding clockwise as you look at the end of the copper tube. And tighten the joint.

This method of using hemp or rolled up plumbers PTFE tape is the same method if you use a hacksaw cut of your copper and run a groove around the tube with a ball bearing crox tool instead of using the ready made copper or brass olive O-ring.

Cutting into an existing water line under the floor:

There will be times when you need to cut into an existing line under the floor or up in the ceiling space. Or coming down into a wall from above which will have to be branched into to keep other fixtures alive with water.

In these cases if the pipe is galv begin near an existing threaded joint and cut with a 24-teeth to the inch hacksaw or sabre saw through the pipe to be branched into with your poly tee.

Your cut about 3-foot (1 M) away from the chosen joint. Take a large plumbers pipe wrench and screwing anticlockwise wind the pipe out of the joint being careful to hold against this leverage with a second wrench on the socket next to you to be maintained at all cost in tact. And then screw out the other section of pipe remaining out of the next joint by sliding yourself near to this joint.

If the second joint is not available due to distance etc. Use a galv repair coupling. Simply slide the big nut and flange and the large rubber seal over the cut end of the pipe along with the body of the repair coupling. Then do the same on its other end with a 4-inch (100 mm) brass barrel nipple and tighten both at the same time. Then use a standard straight brass to poly coupling adaptor fitting and bridge the gap with poly pipe now placing your tee junction where you want it. Crimp all poly joints.

Fittings for shower mixers and slide rails:

Mount your shower mixer so you have a little room to place a loose-coupled nut ½-inch (15 mm) poly elbow on the hot and cold entry points on the mixer. If you are using a fixed

shower spray rose head then simply place a straight loose coupled poly adaptor fitting and pipe up to the female wingback placed flush with the outside finished wall surface 6-foot (1.8 M) above the shower tray.

If fitting a slide rail do not forget to place timber in the wall cavity to take the screws of the rails connector sections where they go onto the wall. *NOTE:* Check the amount of offset on the shower rail and its spray head to gain correct placement of this timber fixing.

Also note: It is good plumbing practice to take your mix lead off the top most mixer outlet and run it 2-feet (500 mm) in the air up into the wall and then turn and come back down with elbows to the lower down position of the slide rail female wingback near and above the mixer. This is to create another mixing section before it enters into the shower hose.

Changing over from a normal laundry tub to a supertub:

Follow instructions for Turning off the water supply:

And remove taps by placing a screwdriver in each end and using leverage anticlockwise. Remove trap from waste pipe and remove tub and cabinet.

Open up wall in-between studs to expose original water piping in behind new supertub position. Measure height of inlet nipples on supertub and locate these marks made 8-inches (200 mm) below on your wallboard or on the timber studs.

Now if you located the two laundry hot and cold feed lines rising up past your wall opening simply note what material it is made of; if galv you will have to cut the pipe about a foot (300 mm) above the floor where you have marked the male wingback's to go and make a second cut about a foot (300 mm) above this position to give yourself the room you need to be able to place your timber fixing for the male

wingbacks. And if galv you will need a special galv repair coupling with a brass barrel nipple to bridge the lower hacksaw cut and the poly pipe through to the new male wingbacks position.

Testing of new water feed lines:

Place a 3-inch (75 mm) long brass barrel nipple and a blind brass cap into each female wingback and blind caps on every male wingback. And turn on the water. Were at all possible have someone stand inside the bathroom or near the new pipe work to yell out if there is a crimp ring not sealed leaking out water. Turn the main street pressure on slowly. After you have tested the cold lines open up the hot valve and test the hot pipe work. Turn on the shower and charge the line feeding the shower rail or shower spray rose head.

Using PVC solvent cement:

Place glue inside collar of bend and over end of pipe to go in this collar. Push and twist together in one motion. Positioning as required.

When roughing in waste pipes and bends it is a trick of the trade to mark how far into the collar the pipe is and to also mark the required angle across the top of the pipe and the bend with one straight line pencil mark. This makes it easy to simply line up these marks again once glue is placed.

Replacing a hot water storage cylinder:

Wherever possible simply replace like with like. By taking accurate measurements of the existing inlets and outlets and drawing these up into the forming of either a standard factory made low-pressure copper storage cylinder or a custom manufactured low-pressure copper storage cylinder.

Once your new cylinder is on site. Shut off the cold inlet feed to the old cylinder and place a garden hose on the drain provided. If a drain is not provided ready made you will have to remove the inlet pipe on the downhill side of any valve you can use and connect your hose to this valve.

There are times when you have no choice but to drain the cylinder down after drilling a few

holes in the wooden floor to allow the large amount of water to escape underneath into the basement area. Before opening up the cylinder to drain turn off the gas or the electricity power supply. If unsure if you have safely isolated the electrics turn off the mains switch on the meter board and undo the wires this way. Once the cylinder is draining you can disconnect the other top outlets and any wetback connections when completely drained. For a low pressure cylinder the most piping you may have to replace is underneath the cylinder.

Please note: The topmost hot outflow connection pipe must always travel upwards into the wall away from the top of the cylinder. And it **must not** have a shut off valve fitted on the hot line going out to exhaust in the open air.

If replacing a cylinder with a wetback connected to a fire your careful measuring will pay off with ease of replacement. These copper lines coming into the cylinder will have to be rehemped also by teasing out the hemp and rolling it on your upper leg under your palm with some spit. Then winding this hemp string onto the end of the copper so that the hemp is sandwiched between the thread on the cylinder and the groove bump cross joint near the end of the copper tube. If replacing a mains pressure cylinder take photographs of the existing set up

and buy a new cold feed valve train to replace the worn out valve train already installed at the very base of the mains pressure storage cylinder. There will be instructions by diagram on the valve pack. You may not have access to copper benders so in this case use copper olives and brass elbows to make necessary changes of direction in ½-inch (15 mm) and ¾-inch (20 mm) copper lines. On all of the valve train use teased out hemp and place graphite jointing compound paste on top of the hemped joint to prevent the hemp from drying out. Wind on clockwise as you look at the end of each male threaded fitting etc. Then tighten well.

Installing an instant gas hot water heater:

Choose your unit based on the number of bedrooms and bathrooms and size of family using the system. Follow best gas practice recommendations for the placing of the unit near the bathroom away from windows and doors. Mount the unit by placing a random screw in the wall at the top-mounting bracket and swing the unit off this screw while you go ahead and place the main fixings into the wall to secure the unit. If into timber use either square drive or roofing screws to fix.

Once mounted proceed to provide the unit with a mains street pressure cold supply line. Sometimes this line may come off from under the house by way of a tee joint branched into a cold line. Or because it is best practice to mount the unit near the bathroom gain access through the outside wall to the underneath area inside the vanity cupboard and connect into the existing cold line with a brass tee or a poly tee as the case may be and a small flexi hose. Sometimes a hose tap can be wound out and a brass tee and brass socket fitted and the hose tap refitted to provide a cold line to the new unit. Do the same for the hot out flow line from the unit.

Also begin the process of removing the old hot water storage cylinder from its present position. Drain it down with a garden hose and disconnect the wiring as per instructions given under title Replacing a hot water storage cylinder:

Once the cylinder has drained remove it from the cupboard and disconnect the hot feed supply line pipe out of the cupboard and connect this point under the floor to the new gas hot water heater if you have not done so already under the vanity.

Please note: If the old hot water system used a header tank this will have to be disconnected from the mains street cold pressure line at the tank and blocked off.

Please note: When removing the header tank if you discover that the cold water feed for the shower was coming out of this header tank you will simply connect this branch line going to the shower mixer to the cold water mains pressure line coming into the tank to charge the shower mixer with equal hot and cold mains pressure.

Arrange for the gas bottles and gas line to be installed along with an electricity connection, and test.

Replacing rotten floor or wall timbers:

Sometimes when you open up the floor or the wall in a bathroom or a toilet you may come across rotten timber. Simply grab a screwdriver and see what is solid and what is no longer solid timber. Mark out the damaged areas with crosses or a spray can. Then take accurate measurements of the sizing of the timber to be replaced. Get some damp course in a 4-inch (100 mm) roll to assist in packing out the new timber if it is a slightly smaller sizing.

Cut the old timber portion out and replace from the ground up if necessary. You may need a sabre saw, a circular saw or a chainsaw to achieve this cutting. Take a photograph where possible before you cut the old rotten timber out of the way.

Then simply replace like with like. If you have to replace a pile or place a new pile dig this down to solid clay. And place a part of a brick under the pile on top of the clay. Pour in a bag of dry rapid drying concrete. And pour in a whole bucket of cold water. And mix a little to pack in around the bottom near the part brick. Leave to set before putting any weight on this area.

Replacing timbers in the wall area is just the same only you don't have to concern yourself with the house piles. There are also products you can paint on as timber preservation treatments to finish the job properly.

Repairing or replacing the underground cold feed into the house from the street:

If you do begin to notice water lying where it should not be. Then make sure all taps are off inside the house and taking a large screwdriver remove the cover over the street mains cold supply and placing the screwdriver tip on the tap top place your ear on the top of the screwdriver and listen for the sound of hissing water coming out of a burst under the ground between this tap and the underneath of the house. If you do hear a hiss shut the tap off overnight and check to see if the water level stops rising on the ground outside the house. Also check under the house for any leaks with a torch if possible.

Once these tests show you do indeed have a leak you have two choices. Either dig up around the leak and locate this very burst or bite the bullet and simply replace this cold feed line in with a new alkathene line.

It really depends on what you have under the ground now. If the pipe is rusted out in parts

then it is best to replace the entire length from the street shut off to the underside of the house.

The new piping for this task comes in long coils. And you will need to use a $\frac{3}{4}$ -inch (20 mm) diameter to ensure a good supply unless the pressure is quite low now in which case it will be wiser to run 1-inch (25 mm) diameter piping in. Or simply half-inch (15 mm) if it is very good high pressure.

You dig your trench spade depth under the lawn and deeper in the garden if others will be digging near it. You can dig around the outlet of your street shut off valve and gain access to the pipe work under the ground now. You will have to hacksaw or sabre saw this pipe out of the way if made of galv steel. And with a wrench on the outlet side of the tap screw out the old section of pipe.

Wind in the alkathene adaptor fitting a couple of turns and then wind on the plumbers plastic tape (PTFE) quite a few turns and then tighten with a pair of plumbers' pump pliers. Then remove the big nut and the flared tapered ring collar and place on the end of the pipe and place lubricant on the O-ring left inside the main body and extra collar. Then push the pipe home past the O-ring and bring up the flared

collar and start the nut off and tighten to complete this first joint.

Then roll out the coil piece by piece into your trench. If you have tunneled under a pathway you will need to uncoil the pipe and twist out the loops and feed it under the path with some sticky tape on its end. And then carry on feeding it into your trench until you reach the entry joint under the house or near the house. Where you will repeat the fitting of another alkathene adaptor fitting. Sometimes you may have to bridge the end of the alkathene through with some poly pipe in under the house. Test and fill in your trench being careful not to place any sharp stones up against the new pipe under the ground. Replace the ground covering same out on the street.

Increasing the hot pressure on a low pressure system:

If you have a low-pressure hot water system and you do not have a wetback connected from your cylinder to a fireplace. You are in a position where you can remove the header tank and after placing a pressure-reducing valve on the mains cold feed line that used to go into

your header tank and connecting up all lines heading out of the tank to the outlet side of the pressure reducing valve install a medium relief valve onto the end of the hot exhaust line. This will make a closed loop medium hot water pressure system and will immediately give you more hot water at your showerhead and at all other tap outlets.

Roof leaks in slate:

For a slate repair such as a loose or fallen out slate you will need a specialist tool called a slate knife and a strip of copper metal to steady the new slate instead of using nails up underneath where you cannot reach.

The slate knife is used to easily remove the nails up under the existing topmost slates. Once these are removed the broken slate will fall out all the way. Nail your copper strip to hang down below the new slate by nailing in-between the two exposed slates under the new slate. Then simply turn the copper up and over the bottom of the slate so placed and cut off the excess copper over the top of the end of the slate tile.

Roof leaks in clay or concrete tiles:

When walking on a clay or concrete tile roof place all of your weight on the very front edge of the tiles as it is under this that the timber battens holding them up are. Locate the cracked or broken tiles and slip the claw of a hammer up under the row above just off to the left side of the tile to be removed. Then pull out this tile and slip in the new one. And pull the hammer out to finish.

Sometimes it is necessary to repair a tile with a masonry grade silicone sealant in position. In these cases you must seal down both sides of the tile being sealed as well as the crack itself.

Also sometimes silicone is very useful if there is a crack in the ridge capping or the mortar work.

However the best way to repair the ridge capping is by mixing up 6 parts sharp sand to 1 part cement plus water. And after gently lifting the loose ridge capping run a new bed of mortar and reposition them and run a steel trowel down the sides to finish.

Roof leaks in a steel roof:

Where at all possible locate the leak by viewing its arrival in the attic space under the roof proper. This will give you an accurate realization as to where the water is penetrating inwards. If there is paper fitted under the roof it may be traveling quite some distance before showing up where it has down below in the house.

If there is no roof space to crawl into then measure off an outside window to where the leak is coming into the house. Or use an existing chimney as your guide point to get into the general area of the leak.

If the roof is rusted out and the hole is obvious then proceed to measure up for a replacement of this damaged area in long run if possible or if a very old roof at least the same sized sheets as are used now. If the leak is not obvious look at each nail and look for any sign of a gap into which water will simply track and flow under.

Take a silicone gun with a good flowing silicone in it and simply with the tip cut back about a 45 degree angle proceed to swirl in figure eights

around the outside of any suspect nails and up and over the top to complete each seal like this.

More often than not take special care to go over the fixings on the flat side of the ridge or other flashings. As with expansion and contraction holes can open up to let in a surprising amount of water where it used to be perfectly well sealed before this damage occurred.

If the leak is down the outside wall check the spouting is not overflowing down in behind the fascia board. Or if there is a center or parapet roof gutter take some rags and after cleaning off the joints. Inspect for cracking and if necessary reseal with a swirling of silicone over the top.

Repairing storm water drain blocked by tree roots:

First feed the garden hose into the drain until it hits the blockage. Then remove and laying it out along the lawn locate the dig spot. Next dig up the drain and clear it both sides. The sewer line may have been placed in the same trench

so to make sure we have the correct drain we will proceed as follows. Make an incision into the very top of the clay piping as follows. Begin on the top dead center with a carpenters 4-inch nail punch. Chip away at the clay until you can begin to work outwards and then inwards again to finally break through the outer shell. Chip away at this holes walls until you can get your hand into the drain and remove all of the clay chips. Then have someone inside the house place some toilet paper in the toilet bowl and flush it away. You watch and see if it passes you by. If not double check it is the storm water by running the garden hose down it. If it is the sewer no harm done simply go along to your nearest sheet metal shop and go to their scrap bin and select out a piece of sheet metal big enough to curve over the hole and cleaning off the pipe silicone this metal cover over the hole you have created and move on to locating the storm water drain.

Once you have the storm water drain located for sure use the hose to further get an exact position on the tree roots and smash this section of the drain out of the way. Gaining two points where you have the barrel of the pipe nicely broken ready for two rubber earthenware to PVC adaptors plus a section of 4-inch (100 mm) pipe to replace the missing clay pipe section.

If the break you make is jagged simply clean it up to even for the rubber connector by using a large shifting spanner to nibble away at the clay using leverage. Place the rubber unions on the PVC pipe and lower into position move the rubbers up onto the clay ends and do up the clips with a screwdriver.

Sewer drain blockage repairs:

The first process is to have the drain cleared by a high-pressure water jet unit. You may be able to hire one but it may be just as practical to have a drainage contractor come in and try to first of all remove the blockage.

Either way by following the directions given under Repairing storm water drain blocked by tree roots: Make sure you get the drainage contractor to mark out on top of the ground where he or she thinks the tree root blockage is located under the ground.

Making a repair on a burst galv cold feed line:

Locate the burst and make a hacksaw cut through it. Then feed over one side a Riking galv repair coupling nut and flange then the rubber seal and the body of the fitting will need to be placed evenly over both ends of the pipe. Then tighten and you are done.

Repair of a burst on a cold feed alkathene line:

Dig up enough ground to be able to get some flexible movement of the pipe upwards or across. Either cut the burst section out as tightly as possible and slip the alkathene coupler over both ends or cut a wide gap in the pipe and use two alkathene couplings. Be sure to lubricate the O-rings inside the fitting to ease the pipe inside and past the ring without it rolling over and twisting. Then do up tight with two pairs of pump pliers.

Repairing leaking or sticking taps:

Shut off the water as per instructions Turning off the water supply: at the start of this book. Remove indicator dial. It will either flick out with a craft knife or screw out with a spanner.

Now remove the cross top or dome and remove any body cover to expose the head works. Now with a spanner on the base hex nut of the tap head works turn anticlockwise to undo it. Lift up to expose the spindle and the tap washer itself. Check for wear and tear. Place your fingernail inside the tap and run your nail around the seat to see if your nail drops into any crack that has worn its way into the seat making a tracking channel for the water under the tap washer. If you do strike a crack you will have to use a reseating tool to grind the crack out. Simply insert the reseater tool and wind the top assembly down onto the brass seat and holding this section still wind the very top of the reseater to begin grinding away at the crack to completely remove it. Remove the reseater and after flushing with water you will be able to see the progress.

Also you may be able to fit a dome-like tap washer which is designed to sit down inside the hole created by the seat and bypass the crack in the seat with a better chance of success if you want to try this way of doing it before going to the expense of buying a reseater tool.

Note: These dome-like washers have a really soft turn off. So only turn the tap till it stops leaking.

While you have the head works out wind the stem out of the head and lubricate the thread to ease any future sticking. If this does not stop the tap from sticking it means the shaft is damaged beyond repair and the tap needs a new head works. But before you go buying a new head works set check out the cost of buying a whole new tap, as the head-works can be expensive alone.

Replacing or placing a tap into a wingback in the wall:

To begin you will need to measure the rough distance from the inside of the wingback internal female thread and the outer wall plus

about three-quarters of an inch (20 mm) to go into the female end of the tap such as a laundry, kitchen or bath tap. The brass tube you need to join these two points together is called nipples brass or threaded tubing. It comes in two common sizes. $\frac{1}{2}$ -inch (15 mm) for kitchen and laundry taps and $\frac{3}{4}$ -inch (20 mm) for bath taps. With the existing tap wound out anticlockwise you may find the old nipples brass stayed threaded into the wall bound wingback. In this case simply tease out a length of hemp from your wrist to your elbow and wind clockwise onto the protruding nipples brass and wind the new tap into position with a screwdriver inserted inside the outlet of the tap.

However if you have to work between the wingback in the wall and the new tap. Simply take the section of threaded brass tube and wind it into the wingback all the way then back off one and a half turns back out. Then mark with a mini hacksaw the next cut allowing about $\frac{3}{4}$ -inch (20 mm) to go into the back of the female thread of the new tap. Then remove and finish this cut. Either use hemp (old school) or plumbers PTFE tape and wind the threaded brass tube into the back of the tap and tighten by lying the tap down on the ground and placing your foot on it doing the tube up with a pair of pump pliers. Then insert this section of tube into the wall and up against the female wingback where you will be able to tighten it

up till it is in its normal position against the wall.

Note: Hemp is more forgiving than tape as nine times out of ten if there is a leak it will continue to swell and take up the leak whereas with tape you do not get a second chance at all unless you can get another turn out of it which is not likely in these situations.

Changing over your wall kitchen taps for a bench-mounted tap:

The procedure for providing the wingbacks further down the wall is the same as for Changing over from a normal laundry tub to a supertub:

Placing a bench-mounted kitchen sink mixer tap:

Decide on the best position and drill a size hole recommended by the tap ware manufacturer. If drilling into stainless steel you will need an

eighth of an inch (3.0 mm) pilot drill followed by a ½-inch (15 mm) drill bit for steel to allow enough of a hole to give the stainless steel chassis hole cutter access. Use it by tightening the bolt until it breaks through by cutting the stainless steel.

Remove tap body from box and install the hot and cold flexible hoses into the bottom. Next install the threaded bolt pin or pins into the bottom and place the washer. And positioning it over the top of the hole in the bench lower the first hose into the hole followed by a squeeze of the second flexible pipe into the hole. Then position the lever top so that it turns from where you want it to where you want it to go. Then go under the bench in the cupboard and place the rubber washer and the mounting plate and the holding nuts. And tighten well with a suitable tube spanner.

Next attach the hot flexi hose to the hot barrel nipple sticking out of the wall and tighten with an 8-inch (200 mm) spanner. Repeat for the cold and then make sure the trap is connected before turning the water on to test.

Installing a dishwasher:

Firstly follow instructions under heading Wingbacks set out for a new kitchen and dishwasher: Then drill a 2 inch (50 mm) wood saw hole in the corner of your sink cupboard next to the wall where the dishwashers back connections are. Then drill another hole the same size next to and below this hole inside the cavity for the dishwasher.

Now fit a $\frac{3}{4}$ -inch (20 mm) by $\frac{1}{2}$ -inch (15 mm) female dishwasher tap to the end of the male barrel nipple underneath inside the sink cupboard.

Next take a waste pipe dishwasher nipple trap and place it up against the plug and waste on the new sink bowl. And connect the outlet of the trap to the waste pipe by way of bends or a straight coupling and PVC solvent cement.

Next slide the dishwasher over near its spot and feed the electric plug through the two holes you cut earlier. Then follow this up with the water hose connection and finally the drain hose. All through into the cupboard as you push in the dishwasher bit by bit.

Hook up water connection hose to dishwasher tap and connect drain hose into nipple on trap making sure this nipple does not have to be drilled out that it is already clear. Next fit the U-shaped bend onto the drain hose and screw up under the sink bowl nice and high to prevent siphoning out.

Fitting a water filter for the first time:

If presently your kitchens tap ware come out of the wall. To provide a simple connection for your under sink water filter you must gain access to the cold feed pipe by opening up the wall under the sink. Once this is done you are either in a position where you can place a filter needle valve tap fitting directly onto a copper pipe or if poly cut a tee in and take off a wingback to take an inline ball fix valve and a small water filter adaptor from ½-inch (15 mm) down to the filter tube small bore size given with the kit. If you find you have a galv pipe you will have to use two repair couplings and bridge the gap in between the barrel nipples with poly adaptors and a tee and a wingback followed by the inline ball fix valve and small filter supplied adaptor fitting.

In many ways it is sometimes best to consider a dual pronged attack of placing in a new filter by changing the piping over and installing a bench mounted tap.

If you already have a bench mounted tap then get underneath it and taking a very short flexi hose fit in a brass ½-inch (15 mm) tee into the line and provide another very short flexi hose to take the ball fix valve and filter adaptor fitting on its end.

Next mount the water filter itself and drill out the ½-inch (15 mm) hole in the bench top for the water filter tap. Then simply connect the small-bore tubing with the kit you purchased and turn on the water and test.

Installing a new vanity:

For this you would already have followed previous instructions under the heading New vanity position: and Installing a vanity waste: This is simply a description of the fit off. You have already fitted the tap ware and the plug and washer waste into the basin.

Turn the vanity cabinet around so you can transfer the measurements of the positions of the wingback barrel nipples and waste pipe elbow onto the back or up through the lower shelf as the case may be. Drill out these holes and slide or lift cabinet into position against

the wall. **Please Note:** The top will overhang the cupboard. Fit tidy plastic flanges to the barrel nipples and waste pipe and proceed to fit the two hot and cold flexi hoses onto the barrel nipples. And fit the trap to the plug and washer waste directly and continue from there with the bends or the straight coupling necessary to bridge the gap between the outlet of the trap and the end of the existing or new waste pipe you have provided or are in the process of installing now. Turn water on and test.

If by any chance the two flexi hoses do not reach. Bridge the gap with a couple of short elbow flexi hoses with two brass nipples in between them.

Building a timber bath cradle:

Work out what thickness of material you will be using to close in the bath sides. Then according to this allowance place a 2-inch X 2-inch (50 mm X 50 mm) timber against the studs on the long side of the bath. Then place a shorter rail on the end of the top tap end of the bath. Then fit the bath and with the use of a spirit level measure down from the hanging corner and deducting 4-inches (100 mm) from

this measurement cut this section by four pieces and cut the two long sides and nail this entire frame together. Then fit it under the bath exterior side and measure up for the remaining end of the bath section to be made.

If using a plastic bath it sits on the floor and is cradled from this position. If a steel bath you can hang it at any height.

Replacing a shower mixer in the wall:

When an older shower mixer begins to go faulty it is just as easy to replace the entire valve as it is to try and hunt down the correct kit of parts for it to find it is worn out inside anyway.

Remove the old faceplate and see how much of the wallboard has been cut out compared to the size of the plate. It is possible to get a mixer with an oversize jumbo plate cover designed for change over mixer installations like this.

Once you have the new mixer and larger cover plate or the exact same mixer as before but

new. Turn off the water as per instructions given at the very start of this book. If the shower mixer cold is feed from a supply tank in the roof space or on the roof you will have to wait until you have drained this down after turning off the supply of water to this header tank out on the street.

Note: A trick of the trade is to tie something around the pipes that are traveling downwards to prevent the loss of a nut inside the wall cavity.

As most situations find no new mixer the same as the old anymore. The easiest way to replace the mixer is to remove the old mixer and place 1-foot (300 mm) flexi hoses onto the pipes in the wall and then onto the new mixer. Then position the new mixer on the mix pipe heading to the spray and screw the mixer back tucking the flexi hoses into the wall as you go. Turn the water back on and test. Fit the cover plate and place handle with Allen key provided.

Fitting a slide rail to your shower:

Try to buy a mid range priced shower rail as usually they are made of metal and outlast the cheaper plastic ones. Also there are some really

excellent sprays on the market now. They do not come cheap but for all the times you are using the shower it is money over years not months.

Remove old shower head rose spray and with either an off the plumbing shop shelf barrel nipple or some nippling brass threaded tubing custom cut as is described under the heading Replacing or placing a tap into a wingback in the wall: Connect the wall to shower hose fitting using PTFE plumbers tape.

Then attach the tapered end of the shower hose to the new spray head and attach the other end to the out of the wall fitting. Just allow the hose to dangle into the shower tray or the bath while you carry on and fix the shower rail proper as follows. Take out screw packet and remove raw plugs, as you will be needing them if you cannot strike timber to fix into. Go for a drill bit about half the diameter of the raw plugs and a slightly bigger drill if needed after trying the first drill out.

Have a dry run at piecing together the slide rail anchor sections with the rail itself. Sometimes it is easier to pop out the end caps that hides the screws, by punching them out, with a long thin screwdriver. Place your first anchor on the wall near the height of the wall cladding or at about 6-feet (1.8 M) off the from

where your feet are. Note: The rail itself does not mount center exactly as the spray head is offset by about 2-inches (50 mm). Mark your top most anchor and drill the hole being careful not to allow the drill bit to rush through into the wall cavity as there are plumbing pipes inside this wall.

After finishing the first hole have a go at fitting the raw plug and if the hole is too small go to the bigger drill size and then fit the raw plug. Then screw the anchor in place and holding the rail up into the anchor mark the hole to be drilled for the bottom anchor. Drill this hole now and place the raw plug and screw the anchor to the wall. Pop in the cover plates. Place spray in holder and adjust it to match your showering requirements.

Note: Do not forget to fit the soap tray before placing the last anchor.

Repairing rusted out steel spouting:

Cut out the damaged section of spouting by running 32-teeth to the inch hacksaw through the front and into the bottom. Continue this cut with a pair of straight tinsnips. Then try and get the straight tinsnips into the back of the

spouting and if not all the way through finish with a sharp carpenters wood chisel to cut the final section of the cut out. Repeat on the other side of the damaged area and remove the spouting out of the brackets.

Take a small section of this spouting down to your local roofing or sheet metal shop and try to get a new match for it. Take this new piece and cut it 4 inches (100 mm) longer than the missing spouting gap. Then clean the joints with rags and hold back any water with other rags. Open up the bead of the very top of the front of the old spouting and place a line of silicone into both joints then place the new section into its new home and close off the bead crunching it back down with a pair of pump pliers. Now take a 3-inch (75 mm) nail and placing it above the back join against the wood fascia bend it over to hold down the very back of the joint together firmly.

Then place rivets in the front and in the bottom and smear these with silicone on the inside of the joint and swirl around in figure eights over the internal joint. Repeat on the other joint. And remove rags and the job is done. If you need to go around a corner with your repair just have the local sheet metal shop make you up this angle.

Installing a house lot of spouting:

Cut out the spouting into 5-yard (5 M) sections by running a 32-teeth to the inch hacksaw through the front and into the bottom. Continue this cut with a pair of straight tinsnips. Then try and get the straight tinsnips into the back of the spouting and if not all the way through finish with a sharp carpenters wood chisel to cut the final section of the cut out. Repeat on the other side of the damaged area and remove the spouting out of the brackets. Remove all old brackets and any nails left in the fascia and sweep off with a broom.

At the highest point where the fall is to begin usually over the top of a wire entry point on the front of the house place your first plastic or metal bracket. Place a nail under this bracket and measure up from the bottom of the fascia board marking this measurement on the opposite corner. And then drive a 3-inch (75 mm) nail below this by about ½-inch (15 mm) to see if the house will have fall to this point if it is still fairly level.

Take your building string line and tie it off between the two nails you have placed, it stretches so you can pull it really tight. Grab

the ladder and move to a point midway between these two nails and using a spirit level check to ensure you indeed have a little bit of fall towards the first down pipe position.

Continue falling smaller sections in this way towards the down pipes. Make it so on the longest sides you are falling towards both ends in which case all you have to do is place your string line and either leave it as is if enough fall to one end or rather it is best practice to simply lift this point up to the point where a bracket is hard up under the roof and then you will utilize all of your hard work to have the water rushing out of these longer sides.

If putting up steel spouting the brackets are placed every yard (1 M) apart. And if installing plastic spouting the brackets go up much closer according to the manufacturers specifications.

A good plastic spouting system can be placed almost level fall wise and this makes for a nice finish against the house.

If installing steel spouting you will be able to buy premade angle sections from your local sheet metal shop. For the best practice of doing all joints on steel spouting see instructions under heading Repairing rusted out steel spouting:

Replacing a downpipe:

Begin up the ladder with two 95-degree elbows. And hold the first elbow off the wall the distance the brackets will hold the downpipe off the wall. With the second elbow over the top of the dropper outlet from the spouting. Measure the straight pipe required between the two elbow sockets. Cut this section of pipe and go back up the ladder and have a dry run at fitting this offset. When it is ok. Use the manufacturers solvent cement and glue these two elbows together and then place dry on remaining length of downpipe.

Lifting the downpipe way up in the air and guiding it onto the spouting outlet dropper mark where the downpipe reaches to and if it is already reaching the drain and hitting the ground take the downpipe down again and remove the offset and getting back up the ladder make a mark where the socket inside is on the wall. Measure from this mark down into the drain adaptor by 2-inches (50 mm) and make this cut and try to fit the downpipe again.

If you can get it to fit take the downpipe out for the last time and glue the offset on at the top and then replace downpipe in position and fit the downpipe clips one per yard (1 per metre).

If you have trouble getting the down pipe up in the air on the dropper and into the drain mark where the downpipe crosses the drain adaptor and cut to this mark and try again and again this way until you manage to fit the downpipe correctly. If this downpipe is going to be a charged system you will need to glue the positions where the adaptor goes into the drain and where the downpipe goes into the adaptor.

Installing a long run steel roof:

Remove all existing roof covering as far as weather permits for the time you have and you are ready to begin. Measure length from ridge board to a point 2- inches (50 mm) into the guttering. Minus 1-inch (25 mm) for allowance for the house being slightly off square.

Locate the new sheets for this measurement and roll out insulation paper and cut to this length. Place this first roll at the top of the roof and staple it down. Then let the rest of this mini roll drop down the purlins into the spouting. Staple it down. Or use galv flat head nails or mini paper clips if available to hammer down.

If starting next to a gable end bargeboard. Position first sheet edge so that a 6-inch (150 mm) side flashing will fit well ending its edge neatly over the top of the second top corrugation in. Now before fixing make two marks on the bottom edge of the sheet 2-inches (50 mm) back to show where the sheet passes by the fascia board and into the spouting. When these two marks are on the fascia you are square with the house and ready to place your first fixings. Do so to secure the sheet. Now you can work off this sheet. Mark the center of the timber or steel purlins onto the sheet edge where you will still see the mark after lapping the next sheet over.

Hipped roof:

If the roof does not have a gable end. Begin your first sheet where the angle of the top ridge drops down laying your longest sheets first across the top ridge. When you finish the last sheet coming across the top ridge board and are beginning to drop down into the lower hip stop and measure the triangle of the roof sheets now still left to do on this side. If there is a large enough area of ground to lay out these same size sheets already with laps and taking the measurement of the widest bottom by the spouting end of this triangle of cuts to be made. Mark this measurement of the very

corner on the sheets laid out on the ground. Then place the measurement of the distance the right-angled side of the triangle rises up the sheets to the top of the triangle from the spouting edge of the sheets. Run a chalk line between these two points and flick on the chalk. Double check your measurements by choosing a measurement in from the sheets already laid say 6-feet (1.8 M) in and measure how long the section of roof is at this point on the ridge from the point 2-inches (50 mm) into the spouting. Check you have the same measurement on your chalk line. If so you have the correct angle and you are all set to cut this chalk line off with either a pair of straight tinsnips or an electric steel nibbler.

Then simply run out your insulation building paper and place your first longest sheet lapped onto the sheets you have already laid. Then at the spouting end sit the sheet where it is 2-inches (50 mm) into the spouting and double check the other side to see that it is also 2-inches (50 mm) into the spouting. If it is not you may have to at times shrink the outer edge of this sheet to assist it to come around to square on again. To shrink the side of the sheet. Place fixings in the lap joint and then lift the edge of the sheet in the middle to shift the outer most edge back shrinking it towards the lap side of the sheet. Now with the sheet puckered up in the middle place a fixing on the outer edge opposite where you want the sheet

to shrink either at the top or the bottom. Then place the rest of the fixings in after rechecking your 2-inches (50 mm) into the spouting mark against the timber or steel fascia board.

If the pitch of the roof is lower enough to easily walk all over you can flick chalk lines after pinning the entire roof on the laps and place the final fixings. However if the roof is very steep and you are constantly working off the purlins fix the sheet off fully as you go with short flicks with your chalk line.

Note: The off cuts from the first triangle you cut will go on the opposite hip section of the roof. When laying these, start with the first two small sheets and line them up into the spouting off the edge of the fascia board using your 2-inch (50 mm) in marks.

Roof valley:

When placing a new valley simply bend 2-inch (50 mm) galv nails over on the top edges of the very outside of the valley coming directly out of the valley board timber or out of the valley purlin timbers. Thus keeping the entire valley nail hole free. Bend the top most section of the valley over at the top to shape two 45-degree angles as a water-proofing fold. Seal this very

inside corner with silicone sealant. And give the valley a turn down into the spouting. Now make marks 2-inches (50 mm) outward from the center of the valley and flick a chalk line between them from top to bottom of the valley. This is the line where the roof sheets will finish. With these chalk lines you will be able to measure and mark out chalk lines on the ground based sheets laid out and ready lapped to fill in these valley sections of the roof. Remember measure twice and cut once.

Note: A trade secret or simply common sense demands making a neat drawing of the roof to be so formed before you make the transfer of these measurements onto the ground based sheets and onwards to cutting them up ready to be fixed into place.

If working with corrugated steel roof use a shifting spanner to turn up the ends where they go up under the ridge covering. Likewise for roof profiles with large pan widths in-between ribs. If you cannot borrow a turn-up tool have a simple one made at a local engineering shop.

Drawing up and costing out the new roof:

To work out the costing for this new roof. Draw a plan of the ridges, gable ends and valleys and transfer accurate sheet measurements and ridge lengths, outside wall spouting measurements etc., onto this plan. Take this plan along to your local roof manufacturer. They will kindly work out for you a list of the sheet lengths and quantity of them you need along with ridge lengths, valleys etc., and the approximate number of roof fixing screws you need. All you have to do is decide on color or plain and profile shape.

Note: Always double check with the supplier the minimum pitch rating for each profile. As if the roof is a very low pitch a low pitch suitable; wide pan wide ribbed profile, may have to be used, even if corrugate was laid there last time around.

Roof fixings:

Where possible use self-drilling roofing screws with rubber seals to fix down the new roof. These will give a longer lifetime of weather proofing when compared to nailing in the

fixings with a hammer. You can either buy a battery roofing gun or hire one by the day for the duration of the project.

Fitting ridge capping:

When working with wide pan roof profile place your ridging where it will sit center of the roof ridge board and carefully mark out the section of the ribs to be cut out to allow the ridge capping to sit down flush with the roof ribs and close off the roof to wind driven rain.

If using a lead or similar ridging for corrugate roofing use a hammer to form this edge into a protective weather barrier into lower corrugations.

Roof safety:

Be careful when roofing. In some parts of the world the government safety requirements demand a scaffold safety railing placed against the spouting around every section of roof a certain distance above ground level. Or a harness to be used whilst laying the roof.

Thank you from Marc Stewart
and happy plumbing.

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